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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,782	04/25/2005	Kazuhide Kumakura	14321.71	6664

22913 7590 01/18/2006

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EXAMINER

IVEY, ELIZABETH D

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 01/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/532,782	KUMAKURA ET AL.	
	Examiner	Art Unit	
	Elizabeth Ivey	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 5-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08 December 2005</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: page 7 of the specification has a minor typographical error in which the word Mode in title “BEST MODE FOR CARRYING OUT THE INVENTION” is misspelled as “Made”. In paragraph 10 on page 4 line 26 of the specification, the word “a” is missing between the words “of” and “nitride”. Appropriate correction is required.

### ***Claim Objections***

Claim 5 is objected to because of the following informalities: the phrase “for growth of nitride semiconductor” is repeated unnecessarily in lines 1 and 2 of the claim. Examiner suggests the elimination of the first recitation of said phrase in each claim. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 6 recite “a layer including N, O, and Al as separately provided”. It is unclear whether the claim requires N, O and Al to be provided separately or the layer to be provided separately. For purposes of furthering examination the examiner interprets the claim to mean the layer is provided separately. Additionally, if the layer is to be provided “separately” it is the examiner’s understanding that the phrase “separately” is redundant because a layer is a separate entity and therefore would be provided separately.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 5 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,744,076 B2 to Fukuyama et al.

Regarding claim 5, the examiner interprets the word layer to allow for the inclusion of multiple films of different materials. Fukuyama discloses aluminum oxynitride and aluminum nitride formed, in that order on a sapphire substrate (column 2 lines 42-48 and column 3 lines 32-38). This would create a layer in which a proportion of N to a composition ratio of N, O, and Al in the first surface (aluminum oxynitride film) would be smaller than in the second surface (aluminum nitride film) as indicated in claim 5. Additionally, in the same layer, a proportion of O to a composition ratio of N, O, and Al in the first surface (aluminum oxynitride film) would be larger than in the second surface (aluminum nitride film). Fukuyama further discloses a Group II semiconductor nitride layer above said layer (column 3 lines 32-57).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,362,515 B2 to Hayakawa.

Regarding claims 5-6, the examiner interprets the word layer to allow for the inclusion of multiple films of different materials. Hayakawa discloses multiple films, including aluminum oxide, aluminum nitride and aluminum oxynitride films, stacked in any combination on a substrate, which may be a sapphire substrate (column 4 lines 10-17 and column 6 lines 34-36). The allowed combination of the films from the substrate in the order of aluminum oxynitride, aluminum nitride and alumina would create a layer of the combined films in which a proportion of N to a composition ratio of N, O, and Al in the first surface (aluminum oxide or aluminum oxynitride film) would be smaller than that in the second surface (aluminum nitride film) as indicated in claims 5-6. Additionally, in the same layer, a proportion of O to a composition ratio of N, O, and Al in the first surface (aluminum oxynitride film) would be larger than that in the second surface (aluminum nitride film). Further, a GaN semiconductor layer may be formed

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over said layer (column 6 lines 62-67). Because Hayakawa discloses all of the films claimed and discloses that they may be arranged in any manner, it would have been obvious to a person having ordinary skill in the art at the time of the invention to create the claimed structure.

Regarding claims 7-10, Hayakawa discloses multiple films, including aluminum oxide, aluminum nitride and aluminum oxynitride films, stacked in any combination on a substrate, which may be a sapphire substrate (column 4 lines 10-17 and column 6 lines 34-36). This combinability allows for any of the layered structures indicated in claims 7-10. Because Hayakawa discloses all of the films claimed and discloses that they may be arranged in any manner, it would have been obvious to a person having ordinary skill in the art at the time of the invention to create the claimed structure.

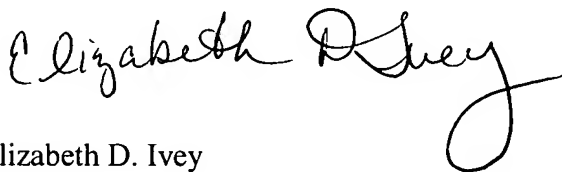
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Ivey whose telephone number is (571) 272-8432. The examiner can normally be reached on 7:00- 4:30 M-Th and 7:00-3:30 alt. Fridays.

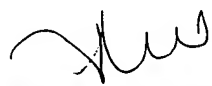
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth D. Ivey



**JENNIFER MCNEIL**  
**PRIMARY EXAMINER**  
12/23/05